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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Atsushi Ichibangase

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EXAMINER

DIAZ, THOMAS C

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/580,551	Applicant(s) ICHIBANGASE ET AL.	
	Examiner THOMAS DIAZ	Art Unit 3656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09/22/2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09/22/2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
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| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>06/20/2008</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

This office action is in response to the reply filed on 09/22/2008. The examiner appreciates and acknowledges applicant's response. Claims 4-7 have been newly added. Claims 1-7 are currently pending.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fiora (US patent 6014909) in view of Genter et al. (US patent 5870928).**

Fiora discloses the following:

Regarding claim 1,

Fiora discloses an arm mechanism for an industrial robot (fig.1, 9 and 11) comprising:

- An arm portion (fig.2, 9) with one-end side (fig.2, 8) and the other-end side (fig.2, 16) which is rotatable around the axis (fig.2,10) which extends through both sides;

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- A driving portion (fig.2, 25-27, arrangement of motors) which is located apart from the axis (fig.2,10) and disposed in said one-end side and has a reduction gear coupled to an output shaft of a driving motor (fig.2, 25,26,27 and col.3, lines 1-5);
- A driven gear (fig.2, 29) which is connected to the other end portion;
- A passing hole (fig.2, 40, space inside tube) is disposed along the rotation axis and passes through the driven gear as depicted in figure 2 such that both ends of the arm portion communicate;

Fiora fails to disclose a scissors gear disposed on the output shaft of said reduction gear.

Genter et al. teaches a scissors gear (fig.5) used in gear trains in order to reduce backlash (col.1, lines 31-33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the scissors gear taught by Genter et al. with the gearing in the robot wrist or arm mechanism taught by Fiora in order to produce an arm mechanism with an anti-lash gear assembly for reducing backlash (col.1, lines 31-33) and creating a more accurate and precise Robot arm.

Regarding claim 4,

Genter et al. discloses the scissors gear comprises:

- a main spur gear;
- a sub-spur gear;

- a spring (fig.5, 81) urging the main spur gear and the sub-spur gear in opposing turning directions (col.7, lines 4-7; and col.5, line 67- col.6, lines 1-12), wherein the main spur gear and the sub-spur gear overlap with each other and mesh with said driven gear (see fig.5).

Regarding claim 2, Genter et al. discloses

- Accommodating grooves (fig.5, 65, 75) are opposingly recessed in the overlapping faces of the main and sub spur gears (col.5, lines 51-54), respectively, to internally accommodate the springs (fig.5).
- The scissors gear further comprises spring receiving members (fig.5, 74a and 65a) which are fixed inside the accommodating grooves, respectively, and
- said spring held between the spring receiving members such that a center of said spring in an elasticity direction with being is coincident with positions of said overlapping faces (see fig.5).

Regarding claims 3/2, and 3/4, Genter et al. discloses

- A slider (fig.5, 73, The examiner take the position that the hub functions as a slider.) which is disposed in a manner that said slider is fitted into one of said main spur gear and said sub-spur gear and movement in the turning directions of another one of said main spur gear and said sub-spur gear is allowed; and (col. 5, line 67 - col.6, lines 1-2).
- An engaging member (fig.1, 53) which engages the main and sub spur gears via said slider in an overlapping manner (col.5, lines 24-26).

Regarding claim 5, Genter et al. discloses

- A gap (fig.4 or fig.5, 80) is provided between the inner walls of said accommodating grooves and said spring receiving members to allow the spring to expand or contract in the opposing turning directions due to relative movement of the main spur gear and the sub-spur gear (col. 7, lines 4-7).

Regarding claim 6, Genter et al. discloses

- a hole (fig.4, a hole adjacent 65a) is formed in a bottom of each of the accommodating grooves, and each of the spring receiving members is pressingly inserted into the corresponding hole.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fiora (US patent 6014909) in view of Genter et al. (US patent 5870928) as applied to claim 2 above, and further in view of English et al. (USP 2607238).

Regarding claim 7, Genter et al. fails to disclose

- accommodating grooves are provided at positions which are symmetrical with respect to a center of the turning directions of the main spur gear and the sub-spur gear.

English et al. teaches a scissors gear with accommodating grooves (fig.1, 20, 20') which are provided at positions which are symmetrical with respect to a center of the turning directions of the main spur gear and the sub-spur gear in order to provide the same predictable result of reducing the amount of backlash in the gear train.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the scissors gear disclosed by Genter et al. to have

accommodating grooves which are symmetrical with respect to the center of rotation since it would provide the same predictable result of reducing the amount of backlash in the gear train.

Response to Arguments

Applicant's arguments filed 09/22/2008 have been fully considered but they are not persuasive. It is well-known that backlash in any gear train is not desirable as it creates power or transmission losses and in robotic arms it also creates lack of accuracy or precision. The use of a scissors gear as taught by Genter is one effective way of addressing the issue of backlash in gear trains.

Applicant argues that the scissors gear taught by Genter et al. is not capable of rotating in both directions. It is clear from the disclosure provided by Genter et al. (col.7, lines 4-7; and col.5, line 67- col.6, lines 1-12) that the scissors gear indeed does rotate in both directions in order to compensate for the backlash occurring between the gears. Genter et al. specifically discusses both a clockwise rotation and a counter-clockwise rotation and how the scissors gear operates during each rotation. Thus, the combination of Fiora and Genter et al. would have been obvious to one of ordinary skill in the art at the time of the invention.

Furthermore, the independent claim 1 only requires a scissors gear irrespective of its rotational freedom.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS DIAZ whose telephone number is (571)270-5461. The examiner can normally be reached on Monday-Friday 8:30am to 5:30pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571)272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ Thomas Diaz/
Examiner, Art Unit 3656

/Richard WL Ridley/
Supervisory Patent Examiner, Art Unit 3656